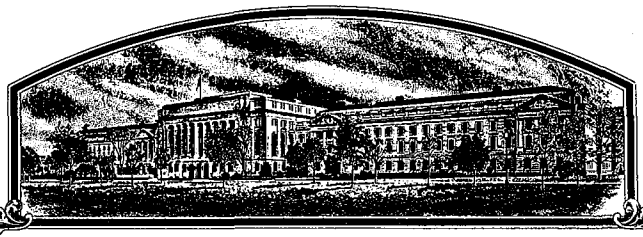

No. 9300300

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Holden's Foundation Seeds, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT ETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT T. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

CORN

'LH218'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington, D.C. *this* 31st *day of* May *in the year of our Lord one thousand nine hundred and* ninety-four.

Attest:

Kenneth B. Evans

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

FORM APPROVED: OMB 0581-0055, Expires 1/31/91

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) *(as it is to appear on the Certificate)*
HOLDEN'S FOUNDATION SEEDS, INC.

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO.
Ex2640

3. VARIETY NAME
LH218

4. ADDRESS *(street and no. or R.F.D. no., city, state, and ZIP)*
201 N. MAPLEWOOD AVENUE
P.O. BOX 839
WILLIAMSBURG, IA 52361

5. PHONE *(include area code)*
(319)668-1100

FOR OFFICIAL USE ONLY

PVPO NUMBER
9300300

FILING Date: Sept. 13, 1993
Time: ☐ A.M. ☐ P.M.

6. GENUS AND SPECIES NAME
ZEA MAYS

7. FAMILY NAME *(Botanical)*
GRAMIEAE

8. CROP KIND NAME *(Common Name)*
CORN, FIELD

9. DATE OF DETERMINATION
NOVEMBER 1990

FEES RECEIVED
Filing and Examination Fee: $ 2,150.00 + 175.00
Date: Sept. 7, 1993 E 09/27/93
Certificate Fee: $ 275.00
Date: May 19, 1994

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*
CORPORATION

11. IF INCORPORATED, GIVE STATE OF INCORPORATION
IOWA

12. DATE OF INCORPORATION
1968

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS
MARK ARMSTRONG
P.O. BOX 839
WILLIAMSBURG, IA 52361
PHONE *(include area code)*: (319)668-1100

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED *(Follow INSTRUCTIONS on reverse)*
- a. [X] Exhibit A, Origin and Breeding History of the Variety.
- b. [X] Exhibit B, Novelty Statement.
- c. [X] Exhibit C, Objective Description of Variety.
- d. [X] Exhibit D, Additional Description of Variety.
- e. [X] Exhibit E, Statement of the Basis of Applicant's Ownership.
- f. [X] Seed Sample (2,500 viable untreated seeds). Date Seed Sample mailed to Plant Variety Protection Office 9/3/93
- g. [X] Filing and Examination Fee ($2,150) made payable to "Treasurer of the United States."

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See section 83(a) of the Plant Variety Protection Act.)*
☐ YES *(If "YES," answer items 16 and 17 below)* ☒ NO *(If "NO," skip to item 18 below)*

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☐ YES ☐ NO

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ YES *(If "YES," through* ☐ Plant Variety Protection Act ☐ Patent Act. Give date. _____ *)*
☒ NO

19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?
☐ YES (If "YES," give names of countries and dates)
☒ NO

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT *(Owner(s))*	CAPACITY OR TITLE	DATE
Don Holden	PRESIDENT	9/3/93
SIGNATURE OF APPLICANT *(Owner(s))*	CAPACITY OR TITLE	DATE

Origin and Breeding History of the Inbred

Exhibit A

LH218 was developed from the single cross LH123Ht x LH51 selfed twice. Then, selected ear rows were crossed with LH50. This combination was then selfed and the pedigree system of plant breeding was used in the further development of LH218. Yield, stalk quality, root quality, disease tolerance, late plant greenness, late plant intactness, ear retention, pollen shedding ability, silking ability and corn borer tolerance were the criteria used to determine the rows from which ears were selected.

LH123Ht, LH51 and LH50, the progenitors of LH218, are all proprietary field corn inbred lines of Holden's Foundation Seeds, Inc. On December 29, 1983, Holden's Foundation Seeds, Inc. applied for plant variety protection of LH123Ht and was awarded certificate #8400030 on February 22, 1985. On January 20, 1982, Holden's Foundation Seeds, Inc. applied for plant variety protection of LH51 and was awarded certificate #8200062 on June 30, 1983. On the following pages are a summary and description of the development of LH218. Also included are copies of pages from Holden's Foundation Seeds, Inc. nursery books. The rows associated with the development of LH218 have been highlighted.

Attached is a statement from the originating plant breeder, Gary D. Arthur, Holden's Foundation Seeds, Inc., stating that LH218 is stable, uniform and free of variance.

Origin & Breeding History of the Inbred
LH218 = Ex2640 = LH50)(LH123 x LH51

Exhibit A

Row/Field	Pedigree	Location	Year
East Dasenbrock	LH218	Indiana	1992
3940-49	Ex2640	Indiana	1991
2253	LH50)(LH123 x LH51 @4	Indiana	1990
1945	LH50)(LH123 x LH51 @3	Indiana	1989
1249	LH50)(LH123 x LH51 @2	Hawaii	1988-89
4270	LH50)(LH123 x LH51 @1	Indiana	1987
3521	LH50)(LH123 x LH51 @2	Indiana	1986
4314 4315	LH50 LH123 x LH51	Indiana	1985
9597	LH123 x LH51 @1	Indiana	1984
4:190	LH123 x LH51	Hawaii	1983-84
3:3078 134	LH123 LH51	Hawaii	1983

Uniformity Statement

Exhibit A

I have observed LH218 during the last three generations it has been increased: 1990 Indiana nursery row 2253; 1991 Indiana nursery rows 3940-3949; and 1992 Iowa production East Dasenbrock. In each of these increases, seeds from the previous generation were planted. LH218 is stable and uniform. The inbred line is also free of variance from within the population.

Gary D. Arthur
Plant Breeder
Holden's Foundation Seeds, Inc.

Novelty Statement

Exhibit B

LH218 most closely resembles LH51. However, the most distinguishing characteristic is brace root colors. Anthocyanin is present in the brace roots of LH218 and the brace roots are red in color. Anthocyanin is absent in the brace roots of LH51 and the brace roots are green in color. This characteristic can be seen in the photographs below.


LH218


LH51

FORM APPROVED. OMB NO. 40-R3712

FORM GR-470-28
(2-15-74)

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
GRAIN DIVISION
HYATTSVILLE, MARYLAND 20782

EXHIBIT C
(Corn)

OBJECTIVE DESCRIPTION OF VARIETY

CORN *(ZEA MAYS)*

NAME OF APPLICANT(S)
HOLDEN'S FOUNDATION SEEDS, INC.

ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)*
201 N. MAPLEWOOD AVENUE
PO BOX 839
WILLIAMSBURG, IA 52361

FOR OFFICIAL USE ONLY

PVPO NUMBER
9300300

VARIETY NAME OR TEMPORARY DESIGNATION
LH218

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

1. TYPE:

[2] 1 = SWEET 2 = DENT 3 = FLINT 4 = FLOUR 5 = POP 6 = ORNA. ,ENTAL

2. REGION WHERE BEST ADAPTED IN THE U.S.A.:

[4] 1 = NORTHWEST 2 = NORTHCENTRAL 3 = NORTHEAST 4 = SOUTHEAST
5 = SOUTHCENTRAL 6 = SOUTHWEST 7 = MOST REGIONS

3. MATURITY (In Region of Best Adaptability):

(Under "comments" (pg. 3) state how heat units were calculated)

[8][8]	DAYS FROM EMERGENCE TO 50% OF PLANTS IN SILK	[1][4][6][5] HEAT UNITS
[–][–]	DAYS FROM 50% SILK TO OPTIMUM EDIBLE QUALITY	[–][–][–][–] HEAT UNITS
[–][–]	DAYS FROM 50% SILK TO HARVEST AT 25% KERNEL MOISTURE	[–][–][–][–] HEAT UNITS

4. PLANT:

[2][3][7] CM. HEIGHT (To tassel tip)

[0][9][3] CM. EAR HEIGHT (To base of top ear

[1][6] CM. LENGTH OF TOP EAR INTERNODE

Number of Tillers:

[1] 1 = NONE 2 = 1–2 3 = 2–3 4 = > 3

Number of Ears Per Stalk:

[1] 1 = SINGLE 2 = SLIGHT TWO-EAR TENDENCY
3 = STRONG TWO-EAR TENDENCY 4 = THREE-EAR TENDENCY

Cytoplasm Type:

[1] 1 = NORMAL 2 = "T" 3 = "S" 4 = "C" 5 = OTHER (Specify) _____

5. LEAF (Field Corn Inbred Examples Given):

Color: 5 GY 4/4 MUNESLL COLOR CHARTS FOR PLANT TISSUES

[*] 1 = LIGHT GREEN (HY) 2 = MEDIUM GREEN (WF9) 3 = DARK GREEN (B14) 4 = VERY DARK GREEN (K16

Angle from Stalk (Upper half):

[2] 1 = < 30° 2 = 30–60° 3 = > 60°

Sheath Pubscence:

[1] 1 = LIGHT (W22) 2 = MEDIUM (WF9)
3 = HEAVY (OH26)

Marginal Waves:

[2] 1 = NONE (HY) 2 = FEW (WF9) 3 = MANY (OH7L)

Longitudinal Creases:

[2] 1 = ABSENT (OH51) 2 = FEW (OH56A)
3 = MANY (PA11)

Width:

[1][0] CM. WIDEST POINT OF EAR NODE LEAF

Length:

[0][7][4] CM. EAR NODE LEAF

[1][2] NUMBER OF LEAVES PER MATURE PLANT

7

9300300

6. TASSEL:

[0][6] NUMBER OF LATERAL BRANCHES

Branch Angle from Central Spike:

[1] 1 = < 30° 2 = 30–40° 3 = > 45°

Penduncle Length:

[1][6] CM. FROM TOP LEAF TO BASAL BRANCHES

Pollen Shed:

[3] 1 = LIGHT (WF9) 2 = MEDIUM 3 = HEAVY(KY21)

[1] **Anther Color:** 1 = YELLOW 2 = PINK 3 = RED 4 = PURPLE 5 = GREEN

[5*] **Glume Color:** 6 = OTHER (Specify) _____ * w/ brown margin

Pollen Restoration for Cytoplasms (o = Not Tested, 1 = Partial, 2 = Good)

[0] "T" [0] "S" [0] "C" [0] OTHER (Specify Cytoplasm and degrees of restoration) _____

7. EAR (Husked Ear Data Except When Stated Otherwise):

[1][7] CM LENGTH [4][1] MM. MID-POINT DIAMETER 1[0][8] GM. WEIGHT

Kernel Rows:

[2] 1 = INDISTINCT 2 = DISTINCT [1][0] NUMBER

[2] 1 = STRAIGHT 2 = SLIGHTLY CURVED 3 = SPIRAL

Silk Color (Exposed at Silking Stage):

[1] 1 = GREEN 2 = PINK 3 = SALMON 4 = RED

Husk Color:

[1] FRESH

[6] DRY

1 = LIGHT GREEN 2 = DARK GREEN 3 = PINK 4 = RED 5 = PURPLE 6 = BUFF

Husk Extention: (Harvest Stage)

[4] 1 = SHORT (Ears Exposed) 2 = MEDIUM (Barely Covering Ear) 3 = LONG (8–10CM Beyond Ear Tip) 4 = VERY LONG (> 10 CM)

Husk Leaf:

[1] 1 = SHORT (< 8 CM) 2 = MEDIUM (8–15 CM) 3 = LONG (> 15 CM)

Shank:

[1][4] CM LONG [8] NO. OF INTERNODES

Position at Dry Husk Stage:

[1] 1 = UPRIGHT 2 = HORIZONTAL 3 = PENDENT

Taper:

[2] 1 = SLIGHT 2 = AVERAGE 3 = EXTREME

Drying Time (Unhusked Ear):

[2] 1 = SLOW 2 = AVERAGE 3 = FAST

8. KERNEL (Dried):

Size (From Ear Mid-Point):

[1][1] MM LONG [1][0] MM. WIDE [0][4] MM. THICK

Shape Grade (% Rounds)

[ ] 1 = < 20 2 = 20–40 3 = 40–60 4 = 60–80 5 = > 80

8. KERNEL (Dried) :

[8] **Pericarp Color:** 1 = COLORLESS 2 = RED-WHITE CROWN 3 = TAN 4 = BRONZE 5 = BROWN 6 = LIGHT RED 7 = CHERRY RED 8 = VARIEGATED (Describe) bronze at the pedicel becoming colorless at the crown

[1] **Aleurone Color:** 1 = HOMOZYGOUS 2 = SEGREGATING (Describe) _____

[1] 1 = WHITE 2 = PINK 3 = TAN 4 = BROWN 5 = BRONZE 6 = RED 7 = PURPLE 8 = PALE PURPLE 9 = VARIEGATED (Describe) _____

[3] **Endosperm Color:** 1 = WHITE 2 = PALE YELLOW 3 = YELLOW 4 = PINK-ORANGE 5 = WHITE CAP.

Endosperm Type:

[3] 1 = SWEET (su1) 2 = EXTRA SWEET (sh2) 3 = NORMAL STARCH 4 = HIGH AMYLOSE STARCH 5 = WAXY STARCH 6 = HIGH PROTEIN 7 = HIGH LYSINE 8 = OTHER (Specify) _____

[3][4] GM. WEIGHT /100 SEEDS (Unsized Sample)

9. COB:

[3][0] MM. DIAMETER AT MID-POINT

Strength:

[2] 1 = WEAK 2 = STRONG

Color:

[3] 1 = WHITE 2 = PINK 3 = RED 4 = BROWN 5 = VARIEGATED 6 OTHER (Specify) _____

10. DISEASE RESISTANCE (0 = Not Tested, 1 = Susceptible, 2 = Resistant):

[0]	STALK ROT (Diplodia)	[0]	STALK ROT (Fusarium)	[0]	STALK ROT (Gibberella)
[0]	NORTHERN LEAF BLIGHT	[0]	SOUTHERN LEAF BLIGHT	[0]	SMUT
[0]	SOUTHERN RUST	[0]	CORN SMUT	[0]	BACTERIAL WILT
[1]	BACTERIAL LEAF BLIGHT	[0]	MAIZE DWARF MOSAIC	[0]	STUNT
[0]	OTHER (Specify) Erwinia Steartii				

11. INSECT RESISTANCT (0 = Not Tested, 1 = Susceptible, 2 = Resistant):

[0]	CORNBORER	[0]	EARWORM	[0]	SAPBEETLE	[0]	APHID
[0]	ROOTWORM (Northern)	[0]	ROOTWORM (Western)				
[0]	ROOTWORM (Southern)	[0]	OTHER (Specify) _____				

12. VARIETIES MOST CLOSELY RESEMBLING THAT SUBMITTED FOR THE CHARACTERS GIVEN:

CHARACTER	VARIETY	CHARACTER	VARIETY
Maturity	LH51	Kernel Type	LH51
Plant Type	LH51	Quality (Edible)	
Ear Type	LH51	Usage	LH51

REFERENCES:

U.S. Department Agriculture. Yearbook 1937.

Corn: Culture, Processing, Products. 1970 Avi Publishing Company, Westport, Connecticut. (Numerous (Authors)

Emerson, R.A., G.W. Beadle, and A.C. Fraser. A Summary of Linkage Studies in Maize.Cornell A.E.S., Mem. 180. 1935.

The Mutants of Maize. 1968. Crop Science Society of America. Madison, Wisconsin.

Stringfield, G.H. Maize Inbred Lines of Ohio. Ohio A.E.S. Bul. 831. 1959.

Butler, D.R. 1954 — A System for the Classification of Corn Inbred Lines — PhD. Thesis, Ohio State University.

COMMENTS:

$$GDD = \frac{Tmax + Tmin}{2} - 50°F$$

$Tmax \leq 86°F$

$Tmin \geq 50°F$

9

Additional Description of the Inbred

Exhibit D

LH218 is a medium maturity field corn inbred. It flowers similarly to LH51. LH218 is a good pollinator. It has shown susceptibility to Stewart's Leaf Blight.

LH218 contributes excellent standability to hybrids. These hybrids perform similar to or better than comparable LH51 hybrids.

Statement of the Basis of Applicant Ownership

Exhibit E

Holden's Foundation Seeds, Inc., Williamsburg, Iowa, is the sole owner and breeder of the LH218 corn inbred line for which it solicits a certificate of protection.